

We claim:

1. A Hall-current ion source apparatus comprising:

a discharge region;

means for supplying a flow of ionizable gas to said region;

5 an electron-emitting cathode at or near one end of said region;

an anode within said region whereon said anode has an electron-collecting surface;

a magnetic-field within said region and located between  
10 said surface and said cathode;

discharge means to generate ions from said gas and accelerate said ions out of said region;

characterized by said electron-collecting surface being contoured so as to increase the area of said surface by  
15 approximately one-half.

2. A Hall-current ion source apparatus comprising:

a discharge region;

one or more apertures within said region;

means for supplying a flow of ionizable gas to said  
5 region through said one or more apertures;

an electron-emitting cathode at or near one end of said region;

an anode within said region whereon said anode has an electron-collecting surface;

10 a magnetic-field within said region and located between said anode and said cathode;

discharge means to generate ions from said gas and  
accelerate said ions out of said region;

characterized by said electron-collecting surface being  
15 contoured, wherein approximately one-third or more of the area  
of said electron-collecting surface cannot be reached by  
straight lines originating from a given point exterior of said  
ion source.

3. A Hall-current ion source apparatus comprising:

a discharge region;

one or more apertures proximate to said region;

means for supplying a flow of ionizable gas to said  
5 region through said one or more apertures;

an electron-emitting cathode at or near one end of said  
region;

an anode within said region whereon said anode has an  
electron-collecting surface with said surface located between  
10 said apertures and said one end;

a magnetic-field within said region and located between  
said anode and said cathode;

discharge means to generate ions from said gas and  
accelerate said ions out of said region;

15 characterized by said electron-collecting surface being  
contoured, wherein approximately one-third or more of the area  
of said electron-collecting surface cannot be reached by  
straight lines originating from a given point exterior of said  
ion source.

4. A Hall-current ion source apparatus comprising:

a discharge region;

an anode within said region whereon said anode has an electron-collecting surface;

5 an electron-emitting cathode at or near one end of said region;

a magnetic-field within said region and located between said anode and said cathode;

means for supplying a flow of ionizable gas to said  
10 region;

discharge means to generate ions from said gas and accelerate said ions out of said region;

characterized by a baffle means electrically isolated from said anode, wherein said baffle means is configured so  
15 that approximately one-third or more of the area of said electron-collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

5. An ion source as defined in Claim 1, further characterized by a baffle means electrically isolated from said anode, wherein said baffle means is configured so that approximately one-third or more of the area of said electron-  
5 collecting surface cannot be reached by straight lines originating from a given point exterior of said ion source.

6. A method for making a Hall-current ion source including:

providing a discharge region;

providing a means for supplying a flow of ionizable gas  
5 to said region;

providing an electron-emitting cathode at or near one end  
of said region;

providing an anode within said region with said anode  
having an electron-collecting surface thereon;

10 providing a magnetic-field within said region and located  
between said anode and said cathode;

providing a discharge means to generate ions from said  
gas and accelerate said ions out of said region; and

providing contours in said electron-collecting surface  
15 wherein said contours increase the area of said surface by  
approximately one-half or more.

7. A method for making a Hall-current ion source  
including:

providing a discharge region;

providing a means for supplying a flow of ionizable gas  
5 to said region;

providing an electron-emitting cathode at or near one end  
of said region;

providing an anode within said region with said anode  
having an electron-collecting surface thereon;

10 providing a magnetic-field within said region and located  
between said anode and said cathode;

providing a discharge means to generate ions from said  
gas and accelerate said ions out of said region; and

contouring said electron-collecting surface so that  
15 approximately one-third or more of the area of said electron-  
collecting surface cannot be reached by straight lines  
originating from a given point exterior of said ion source.

8. A method for making a Hall-current ion source  
including:

providing a discharge region;

providing one or more apertures proximate to said  
5 discharge region;

providing a means for supplying a flow of ionizable gas  
to said region through said one or more apertures;

providing an electron-emitting cathode at or near one end  
of said region;

10 providing an anode within said region with said anode  
having an electron-collecting surface thereon;

locating said surface between said apertures and said one  
end;

providing a magnetic-field within said region and located  
15 between said anode and said cathode;

providing a discharge means to generate ions from said  
gas and accelerate said ions out of said region; and

contouring said electron-collecting surface so that  
approximately one-third or more of the area of said electron-  
20 collecting surface cannot be reached by straight lines  
originating from a given point exterior of said ion source.

9. A method for making a Hall-current ion source  
including:

providing a discharge region;

providing an anode within said region with said anode  
5 having an electron-collecting surface thereon;

providing an electron-emitting cathode at or near one end  
of said region;

providing a magnetic-field within said region and located  
between said anode and said cathode;

10 providing a means for supplying a flow of ionizable gas  
to said region;

providing a discharge means to generate ions from said  
gas and accelerate said ions out of said region;

providing a baffle means electrically isolated from said  
15 anode; and

configuring said baffle means so that approximately one-  
third or more of the surface area of said electron-collecting  
surface cannot be reached by straight lines originating from  
a given point exterior of said ion source.